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modern methods of illustration. Its purpose is to give a general popular knowledge of these processes, rather than to give those explicit directions which would enable one to carry them out in practice. In one or two places the description is not quite clear, as in the account of Mr. Eckstein's process, on p. 45. Again: under 'Instantaneous photography,' the statement of some of the optical phenomena is incorrect. But, with these trifling exceptions, the book is an admirable one, and well adapted, in connection with a course of lectures, to serve as a text-book in our colleges and high schools.

In the preface to Clevenger's 'Comparative physiology,' the author states that "Faraday, Huxley, and Tyndall, in chemistry, biology, and physics, with the host of workers in nerve phenomena, have afforded the materials for the author's work. Darwin and Spencer have taught him how to make use of them." The book shows that the writer reads widely, and thinks about what he reads. But to publish the quotations which have impressed one, with the ideas they have awakened, even if those ideas are apt and original, is hardly wise. The work contains some careful observations which have a bearing upon the doctrine of evolution; but these are presented in such a fragmentary way, and in such an anxiously defensive tone, that it is difficult to appreciate their force. The defect in the book is owing to a lack of power of analysis and synthesis. It has no method of arrangement, and it has no easy grouping of analogous fact. Some pages read like a series of proverbs, each one complete, but out of relation to all the rest (pp. 125-129): hence it is difficult to become interested, as the attention is not held. If one has worked out a system of philosophy which reconciles all the facts of physiology and psychology, it should be carefully digested and arranged before being placed before the world, and then its acceptance will largely depend upon a style which attracts, and a confident power of persuasion which convinces.

The plan laid down by the Holders in the preface to their 'Elements of zoölogy' is excellent. Each branch, class, and order is to be plainly defined, and its difference from preceding ones shown. Available examples are to be chosen, and the student encouraged to personal investigation. The specimens described are, as far as possible, available. But the first promise is almost entirely disregarded. Indeed, the author seems to have such a fear of classification, that the book is a mass of facts, without any apparent system of arrangement.

The descriptions of the lower invertebrate classes are so meagre and unsatisfactory, that it is sometimes impossible to tell exactly what group is intended without reference to the heading of the section, or to the cuts, which are generally excellent. Much less could the average student take any given normal specimen, and, by reference to the text, locate it in its proper class, and find there a clear description of its anatomical structure. Why do nearly all our elementary text-books devote from a third to a fourth of their space to mammals and birds, to the neglect of more available, but rather less familiar groups (e.g., insects), which would furnish an inexhaustible mine of material easily accessible to the student's investigation? The notes on the economic importance of different groups form a new and interesting feature; and the bibliography is excellent, in referring almost altogether to works which should be within reach of every teacher and student.

NOTES AND NEWS.

It is announced that a serious revolt against the Turkish power has arisen in Morocco. Six provinces, or confederated bodies of population, are implicated. The situation is grave, though such matters are not rapidly disposed of in that country. Practically, all that part between the 6th and 7th degrees of west longitude from Paris is to-day independent of the sultan; and the Berâber, indomitable and ferocious, have, both in the north and south, revolted against an authority to which, by the way, they were never entirely submissive. Part of this tribe are mountaineers, like the Kabyles; the rest, equally fierce nomads. Together they can muster twenty or thirty thousand rifles in war-time. Morocco for a long time has contained three large regions which maintained their independence. In the quietest times, only about one-half the area denominated Morocco on the best maps has acknowledged the temporal authority of the sultan. The Berâber, moreover, are the clients and religious adherents of the princely family of Sheik Walad Sidi of Algeria, whose head, long resident in Paris, is now the declared enemy of France, and one of the foremost soldiers of the Sénousian confraternity. From these facts, it is evident that serious consequences might flow from the present disturbances.

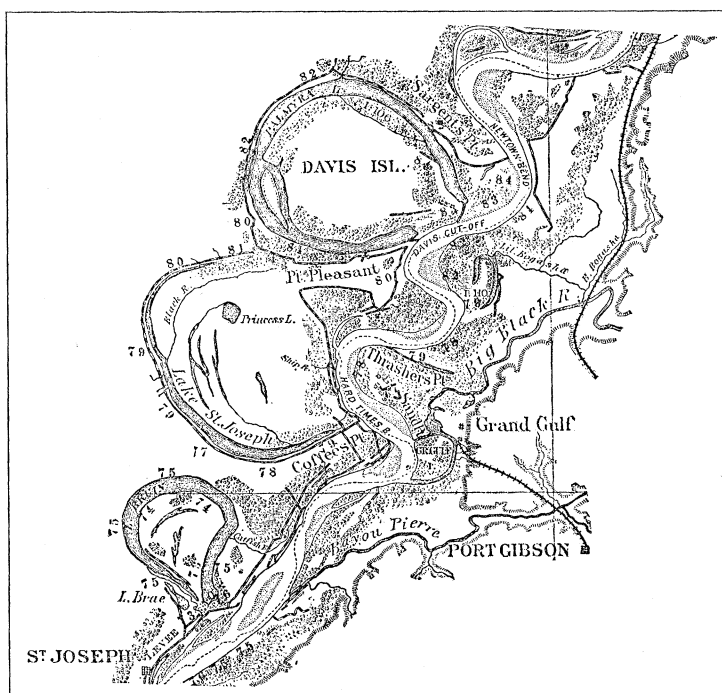
—Serpa-Pinto writes from the Mozambique coast, at Port Bocage, that he is about to lead an important scientific expedition into equatorial Africa for Portugal. He will not visit the Kongo, as has been erroneously reported. He will be assisted in astronomical matters by Lieut. Cardozo and Paul Mapp (photographer), a hundred Zulus armed with modern rifles of the best kind, and four hundred porters. His mission is to study the country between the upper

Zambezi and the coast south of Lake Bangweolo, and it is to be of a purely scientific character.

— The German bark *Ceylon* reports that April 10, in latitude 31° north, longitude 71° west, she was struck by a water-spout, carrying away main and mizzen masts close to the deck, killing the first officer, and seriously injuring Capt. Newman. During the early part of the night, two distant thunder-storms crossed the sky. All sail was furled except reefed lower topsails. Near midnight a low cloud was observed about five degrees above the horizon. The remainder of the sky was clear. The ship was heading north-north-west, and a gentle breeze was blowing from south-west. Suddenly, through the darkness, something that at first seemed a ship was seen quite near, bearing west-north-west. Then all crouched to the deck, for a water-spout was close aboard. The wind struck the bow with hurricane force, while at the wheel aft it became a dead calm. The vessel was thrown over to starboard until the lower yard-arms almost touched the water. Her head was forced round from north-north-west to south-south-east, and the sails torn into ribbons. Then, as the wind came round to starboard, the vessel righted and went over to port, until the rail was under water in almost an instant. The main and mizzen masts were whipped out of her, and the men thrown across the deck, killing the mate. Then suddenly it became calm, and the vessel righted. The captain thinks it all occurred within two or three minutes. During the time they were in the influence of the water-spout, there was a great deal of St. Elmo's fire on all the ironwork of the vessel.

— A brief paper by J. A. Ockerson of St. Louis, on the earlier floods of the lower Mississippi, in the *Journal of the Association of engineering societies* for January last, and a discussion of it by R. E. McMath, furnish some interesting statements about the great river. The conclusion is reached by the first-named author, that, on account of the relation that must exist between mean flood height and the altitude of the flood plain, it is possible to conclude from the equality of height of the actual and long-abandoned river-banks that there has been no perceptible change in the mean flood height for at least two centuries, and hence that the cutting-away of our forests has not yet had a perceptible effect in the régime of the river. The second author justly re-

marks that the exceptional floods may now be higher than formerly without significantly affecting the mean height of floods. The old river-banks alluded to are now seen enclosing the crescent-shaped lakes, so characteristic of rivers that shift their course in alluvial plains; and these are well illustrated in a plate, here copied in part (the main stream is left unshaded), constructed from manuscript maps of the government surveys of 1882 and 1883, of which we are glad to have even this small glimpse. Lake Bruin was cut off before the river was known to navigators; Lake St. Joseph was abandoned probably before 1700, and in the change the river-course was shortened twenty miles or more; Palmyra Lake was



MAP OF OLD RIVER LAKES ALONG THE MISSISSIPPI RIVER.

formed by the Davis cut-off in 1867; it is nineteen miles around, while the neck was less than a mile wide. The slope of the flood plain away from the immediate river-banks, caused by the quick deposit of much sediment near the main channel during overflows, is sometimes very marked. It generally gives a lateral descent of from one to ten feet in a mile, and in an extreme case the fall was 13 feet in 657. The bluffs enclosing the river-bottom are shown on the east, but are not included on the west.

— In the report of the International commission of the Suez Canal, says the *Electrical review*, attention is drawn to the important question of night navigation in the canal by means of the electric light. This subject is said to be under serious consideration, ex-

periments having been made with the electric light between Suez and Ismailia. But it happened, unfortunately, that a bright moon was shining on the night when these experiments were made, the result being that the effect of the electric light was lessened.

— Capt. W. H. Hill reports, that while on board the schooner *Elizabeth*, bound from New York to Newbern, N.C., he met with a heavy gale off Hatteras, wind north-east, heavy sea. He could not clear the Diamond, and had to scud through Hatteras Slough. The sea boarded the vessel, and took the bulwarks away. Fearing for the vessel's safety, oil was poured over the stern, a little at a time, from an ordinary stone jug. This at once smoothed the sea's surface, making it partake of the nature of a ground-swell; and the *Elizabeth* went in without shipping any more seas. A brig, seeing the smooth water astern of this vessel, steered for her wake, and ran through under close-reefed topsails, keeping in the smooth water.

— A summary of observations on earthquake phenomena made in Tasmania, during 1883 and 1884, by Commander Shortt of Hobart, records a great number of moderate shocks during these years, although they had been very rare before. Nearly one hundred disturbances were felt at St. Mary's in February, 1884; and over one thousand have been noted at Gould's Country since April 12, 1883, when the first shock was felt there. These small earthquakes are seldom felt outside of the north-eastern part of Tasmania; and their origin seems to be a hundred or more miles out to sea, near the border of the deep waters which separate Australia from New Zealand.

— The Linnean society of New South Wales again offers a prize of one hundred pounds for the best essay on the life-history of the bacillus of typhoid-fever. The essay must be based entirely on original research, the details of which, and of the methods employed, are to be fully explained; to be delivered before Dec. 31, 1885.

— Mr. C. R. Orcutt of San Diego, Cal., proposes to publish from that place a small quarterly journal devoted to the study of shells, crustacea, and radiates, in the interest of students and collectors of the same.

— The Board of trustees of Indiana university selected Prof. John M. Coulter of Wabash college, and editor of the *Botanical gazette*, to fill the chair of botany in that institution; but it is understood he has declined the position.

— In speaking of the erosion of big guns, Capt. Noble recently explained to a representative of the *Pall-mall budget* that the latest era in gun-making dated back to 1877. The great advance then made resulted directly from experiments with powder. We stepped at once from velocities of fifteen hundred feet to the present velocities of from two thousand feet to twenty-three hundred feet per second. The very high charges now employed (eight hundred and thirty pounds of powder have been fired in a single charge from a hundred-ton gun, and three hundred

pounds from a gun not quite twenty-five tons in weight), and the relatively very long time during which the high pressure and the temperature of the explosion are continued, have aggravated to a very serious extent the evils due to erosion, and the consequent rapid wear of the bores of guns. At the moment of explosion the surfaces of the guns in the vicinity of the charge are in a state of fusion. The heated gases passing over these fused surfaces at a high velocity and pressure, absolutely remove that surface, and give rise to that erosion which is so serious an evil in guns where large charges are employed. All guns are now made with a lining, which is taken out when it has been eroded: the operation may occupy from two to three months. The hundred-and-ten gun could not be fired, with a full battering charge (nine hundred pounds of powder), more than a hundred and fifty rounds; but it will fire an almost indefinite number of smaller charges (say, two-thirds of the full charge) without very serious injury resulting.

— Messrs. J. de Brettes and P. Lacabanne-Courège left Buenos Ayres in January with the intention of traversing the Grand Chaco at its greatest breadth from Corrientes to Candelaria. Persuaded that the misfortunes of previous explorers were due to the presence with them of a force so large as to excite the suspicions of the Indians, thus bringing on active hostilities, these travellers propose to make the journey, accompanied only by two Indian servants.

— Victor Giraud, having reached Paris on his return from central Africa, was received with *éclat* by a deputation from the Société de géographie; and it is announced, that, in recognition of the energy, perseverance, and courage with which he pursued his explorations, the Ministry of marine have proposed him for the cross of the Legion of honor.

— We have received three pamphlets by Dr. Rollin R. Gregg of Buffalo, entitled 'Diphtheria and bacteria,' 'Professor Pasteur's experiments, bacteria in various diseases,' and 'The revelations of fibrin.' They embody the results of the writer's so-called scientific experiments upon fibrine, of which material he finds all forms of bacteria to be composed. Inasmuch as he gives no reason to suppose that any proper methods of sterilization were employed, and displays his ignorance of the fact that distilled water may be full of micro-organisms, it does not seem possible that these papers will command much attention. Indeed, no such work is worthy of criticism; for the day has passed when the pathogenic properties of bacteria, as such, can be disputed, except as the result of the most careful labor by experts in all the methods of manipulation.

— In the article on 'Roads from India to central Asia,' in our last issue, in the third line of the third paragraph, second column of p. 361, 'northern' should read 'southern;' and in the first line of the fourth paragraph, in the same column, 'to the south' should read 'to the north.' In the next to the last line in the first column of the following page, '1883' should be '1881.'